

Sonograms: how to use them

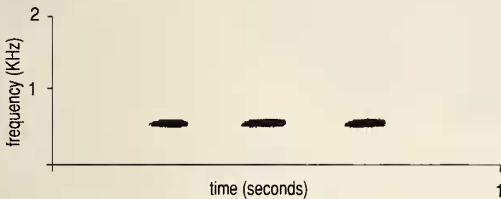
The sound spectrogram, or *sonogram*, is an important method of describing bird sound, being more detailed and objective than the phonetic descriptions one reads towards the end of the species account in most field guides. A sonogram is particularly useful for reference when comparing sounds: it is far easier to compare the subtleties of two bird's vocalisations by looking at both their sonograms simultaneously than by listening to them one after the other.

But how do you *read* a sonogram?

It is just a graph. Time is on the horizontal axis, which one reads from left to right, against which the two other properties of sound - relative amplitude, or loudness, and frequency (equivalent to pitch) - are shown. Frequency is on the vertical axis in (kilo) Hertz and relative amplitude is shown as shades of grey between white (no amplitude) to black (loudest).

A sonogram of a human whistle at constant pitch will appear as a horizontal line. Conversely, a handclap produces a vertical line, showing the brevity of a sound that covers many frequencies at once.

Birds produce a whole range of sounds intermediate between these extremes. The well-known song phrase of a Hoopoe *Upupa epops* produces three evenly-spaced lines at uniform pitch in quick succession. Thus:



In practice, the Hoopoe's simple song is rather easy to transcribe into words compared with most bird sounds, when the sonogram is more necessary. Complex bird sounds often include harmonics. These appear as reflections above the lowest-pitched note and alter its timbre or quality. So when reading a complicated spectrum, concentrate first on only the lowest-pitched notes and look at their change in pitch and the rhythm and timing between the notes.

It is useful to start off by examining sonograms of sounds you know well from memory. *Roberts' Birds of Southern Africa*¹ helpfully includes many sonograms with transcriptions printed over each graph as well as an excellent piece on sonograms (summarised from the introductory sections of the earlier volumes of *Birds of the Western Palearctic*²).

Until recently, sonograms could only be made using the costly equipment solely available to research scientists. But now that cheaper "do-it-yourself" sonograms are possible on personal computers, for example by using Soundedit Pro on Apple Macintosh machines, the usefulness of sonogram analysis is becoming more widely appreciated. ☺

References

1. MacLean, G. L. 1993. *Roberts' Birds of Southern Africa* London: New Holland
2. Cramp, S. and Simmons, K. E. L. 1977. *The Birds of the Western Palearctic*. Oxford: Oxford University Press

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Hoopoe *Upupa epops*
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